ELECTRON MICROSCOPE TECHNOLOGIST SERIES

Code No.	Class Title	Occ. Area	Work Area	Prob. Period	Effective Date
4087	Electron Microscope Technologist I	02	501	6 mo.	01/29/80
4088	Electron Microscope Technologist II	02	501	6 mo.	01/29/80
4089	Electron Microscope Technologist III	02	501	6 mo.	01/29/80
4563(4089)	Electron Microscope Technologist IV	02	501	6 mo.	01/29/80

Promotional Line: 191

Series Narrative

Employees in positions assigned to this series analyze biological or non-biological materials using electron microscopes (visual and photographic microscopes which use electron beams--rather than light beams--to obtain much greater magnifications than light microscopes). They work under the guidance of a senior investigator or clinician in a research or clinical laboratory. They prepare, examine, and research sample materials to provide diagnostic or other types of data for the investigator or clinician.

Several methods are used to prepare specimens for examination under the microscope, such as: (a) fixation-the rapid killing of tissue to preserve it in a condition which resembles the living state as closely as possible; (b) dehydration--the immersion of specimens in special baths to remove water; (c) embedding--the enclosure of specimens with a hard medium (such as epoxy resin) in order to allow thin sections to be cut from them; (d) staining--a process to make the samples more electron dense; (e) sectioning--a process of slicing specimens very thinly, using a manual or automatic microtome with a glass or diamond knife; and (f) mounting--the placement of sample sections on metal grids. After the specimens are prepared, the Technologists scan and photograph them with the electron microscope and develop the photographic negatives into prints.

Electron Microscope Technologists are also responsible for the daily maintenance and minor repair of the microscopes. Higher level Technologists may also conduct research studies and train, schedule, and evaluate lower level Technologists and students.

DESCRIPTION OF LEVELS OF WORK

Level I: Electron Microscope Technologist I 4087

Employees in positions at this level work under direct supervision and perform duties involved in the preparation of materials for observation on an electron microscope. They also operate electron microscopes and auxiliary equipment (such as microtomes, evaporators, knife breakers, photo enlargers, photoprocessors, and print dryers).

An electron Microscope Technologist I typically--

1. collects samples from a clinical or research laboratory

2. preserves tissue in a fixing solution and/or dehydrates the tissue and embeds it

3. prepares specimens for analysis using various techniques, such as staining and evaporating

4. prepares glass knives used to cut tissue to microscopic dimensions

5. cuts and trims tissues to microscopic dimensions, using an ultramicrotome; places trimmed sections on grids for inspection under an electron microscope

6. observes and photographs the tissue, using an electron microscope

7. develops and prints electron microscope negatives

8. in conjunction with an Electron Microscope Technologist II, participates in the maintenance of an electron microscope, i.e. routinely cleans the exterior of the microscope to keep it dust free

9. maintains records of daily activities, such as keeping a list of samples prepared and examined

10. performs related duties as assigned

Level II: Electron Microscope Technologist II 4088

Employees in positions at this level work under general supervision and perform specialized technical duties involved in the preparation of material for observation under an electron microscope; they also operate and maintain electron microscopes and auxiliary equipment.

An Electron Microscope Technologist II typically--

1. prepares specimens for observation under an electron microscope, using specialized techniques, such as negative staining, metal evaporation, and freeze - etching

2. makes glass knives; uses and maintains diamond knives

3. cuts and trims tissue to microscopic dimensions, using an ultra-microtome

4. places tissue sections under an electron microscope for examinations, photographs the area of interest

5. develops and prints photographic negatives

6. cleans and maintains the basic parts of an electron microscope, such as the filament and specimen holder

7. maintains records and files of specimens prepared and photographed; maintains level of supplies in the laboratory

8. assists in the supervision and/or training of lower level Technologists and students

9. performs related duties as assigned

Level III: Electron Microscope Technologist III 4089

Employees in positions at this level perform complex technical duties that require a broad understanding of electron microscopy, they may also supervise a section of an electron microscope laboratory or unit. They work under direction from higher level personnel.

An Electron Microscope Technologist III typically--

1. directs, schedules, and evaluates the work of lower level Technologists and students
2. reports deficiencies in new, modified, or special tests and procedures
3. examines specimens and develops photographic negatives, using complex methods and procedures, such as autoradiography or cryoultramicrotomy
4. serves as consultant or advisor on an area of assignment to subordinates or investigators
5. assumes responsibility for implementation of assigned portions of research projects
6. maintains a file of current data concerning electron microscopy methods and procedures; follows the latest literature on methodology and instrumentation
7. maintains and repairs the basic parts of an electron microscope and related instruments
8. maintains records of work performed and prepares reports; maintains inventory of supplies and equipment used in the section
9. performs related duties as assigned

Level IV: Electron Microscope Technologist IV 4563(4089)

Employees in position at this level work under administrative direction and assign, direct, review, and evaluate the work in an electron microscope laboratory. They are also responsible for the acquisition of supplies and equipment, the maintenance of electron microscopes, and communication with the administration of the department. They serve as specialists in electron microscope techniques. They also initiate complex research projects and instruct lower level Technologists, students, and researchers in the theory and techniques involved in the use of electron microscopes, auxiliary equipment, and darkroom procedures.

The Electron Microscope Technologist IV typically--

1. trains and supervises laboratory personnel in laboratory techniques, such as sample preparations and darkroom techniques
2. instructs students and Technologists in the operation and maintenance of an electron microscope
3. evaluates the effectiveness of established electron microscope procedures and adapts new methods
4. initiates and develops research projects or major portions outlined by superiors; participates in the presentation of research papers, demonstrations, and workshops

5. attends administrative meetings and participates in policy - making decisions for the operation of the facility, such as initiating plans and procedures for improving operational details

6. serves as consultant concerning the purchase, modification, and operation of electron microscopes and auxiliary equipment

7. selects, promotes, and dismisses staff members according to performance standards; develops personnel practices with staff participation and administers personnel policies, such as establishing and enforcing safety regulations

8. maintains a card bibliography of publications in the field of electron microscopy; maintains records of samples processed and plates photographed; maintains log book of instruments, records of instrument users, and files of reference

9. takes periodic inventory of supplies and equipment and prepares requisition forms to replenish supplies

10. assumes responsibility for the care, maintenance, and performance of electron microscopes and auxiliary equipment

11. performs other duties as assigned

MINIMUM ACCEPTABLE QUALIFICATIONS REQUIRED FOR ENTRY INTO

Level I: Electron Microscope Technologist I 4087

CREDENTIALS TO BE VERIFIED BY PLACEMENT OFFICER

1. any one or any combination of the following types of preparation:

   (a) college credit for course work in the biological and/or physical sciences at the introductory level or higher

   (b) work experience and/or training in areas closely related to electron microscopy (such as histology)

   that totals 1.0 unit according to the following conversion rates*-

   12 semester hours of "a" = 1.0 unit

   12 months of "b" = 1.0 unit

*Amounts of the various types of experience or training less than those defined above as being equivalent to 1.0 unit should be converted to decimal equivalents and added together when computing combinations of the different types of preparation listed above.

PERSONAL ATTRIBUTES NEEDED TO UNDERTAKE JOB

1. knowledge of laboratory safety practices
2. ability to operate electron microscope and auxiliary equipment (such as microtomes, evaporators, knife breakers, photo enlargers, print processors, or print dryers)
3. ability to keep records and write reports
4. ability to follow oral and written reports
5. ability to work on tedious microscopic specimens for extended periods of time
6. manual dexterity

Level II: Electron Microscope Technologist II 4088

CREDENTIALS TO BE VERIFIED BY PLACEMENT OFFICER

1. (A) successful completion of six-month formal training program in electron microscopy techniques and technology

or

(B) any one or any combination of the following types of preparation:

(i) college credit for course work in the biological and/or physical sciences that included training in, or that required the use of, electron microscopy techniques and technology

(ii) work experience comparable to the next lower level of this series

that totals 1.0 unit according to the conversion rates*:

24 semester hours of "i" = 1.0 unit

24 months of "ii" = 1.0 unit

*Amounts of the various types of experience or training less than those defined above as being equivalent to 1.0 unit should be converted to decimal equivalents and added together when computing combinations of the different types of preparation listed above.

PERSONAL ATTRIBUTES NEEDED TO UNDERTAKE JOB

1. knowledge of electron microscopy terminology, equipment, and techniques

2. skill in the operation of electron microscopes and auxiliary equipment (such as microtomes, evaporators, knife breakers, photo enlargers, print processors, or print dryers)

3. skill in cleaning and maintaining the basic parts of an electron microscope

4. skill in cutting and trimming tissue

5. skill in the performance of darkroom techniques (such as developing negatives, printing enlargements, or preparing slides)

6. possession of attributes listed for the first level of this series

Level III: Electron Microscope Technologist III 4089

CREDENTIALS TO BE VERIFIEC BY PLACEMENT OFFICER

1. (A) Baccalaureate degree in one of the life sciences with specialization in electron microscopy techniques and technology

or

(B) (i) possession of credentials required for the next lower level of this series and

(ii) any one or any combination of the following types of preparation:

(a) additional college credit for course work in, or requiring the use of, electron microscopy techniques and technology

(b) work experience comparable to the next lower level of this series

that totals 1.0 unit according to the following conversion rates*:

12 semester hours of "a" = 1.0 unit

12 months of “b” = 1.0 unit

*Amounts of the various types of experience or training less than those defined above as being equivalent to 1.0 unit should be converted to decimal equivalents and added together when computing combinations of the different types of preparation listed above.

PERSONAL ATTRIBUTES NEEDED TO UNDERTAKE JOB

1. knowledge of complex preparation techniques, such as negative staining
2. skill in the operation of electron microscopes and auxiliary equipment
3. ability to repair, and skill in the maintenance of, and electron microscope and related instruments
4. ability to implement research projects
5. supervisory ability
6. possession of attributes listed for the two lower levels of this series

Level IV: Electron Microscope Technologist 4563(4089)

CREDENTIALS TO BE VERIFIED BY PLACEMENT OFFICER

1. possession of credentials required for the next lower level of this series and one year of work experience comparable to that gained at the next lower level of this series

PERSONAL ATTRIBUTES NEEDED TO UNDERTAKE JOB

1. skill in the performance of complex analysis and tests, such as cryoultramicrotomy
2. supervisory ability
3. ability to manage an electron microscope laboratory
4. ability to collect research data and keep records accurately
5. ability to work with departmental administrators and participate in policy-making decisions
6. ability to serve as a consultant concerning the purchase, operation, and maintenance of electron microscopes

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*Amounts of the various types of experience or training less than those defined above as being equivalent to 1.0 unit should be converted to decimal equivalents and added together when computing combinations of the different types of preparation listed above.

Electron Microscope Technologist I	(REVISED)
Electron Microscope Technologist II	(REVISED)
Electron Microscope Technologist III	(REVISED)
Electron Microscope Technologist IV	(NEW)